

CLAIMS:

WHAT IS CLAIMED IS:

5           1.     An apparatus for non-contact dispensing of a fluid onto a substrate comprising:

          a hydrophilic interior wall of a conduit dimensioned for drawing a liquid by capillary action therein in a volume less than about 10 microliters;

          a hydrophobic medium adjoining said hydrophilic wall and defining an  
10    interface therewith for resisting flow of said liquid into said capillary beyond said interface; and

          a source of a pressure for ejecting fluids drawn into said capillary.

          2.     An apparatus as in claim 1, wherein said source is adapted for  
15    delivering a pressure pulse for ejecting fluids.

          3.     An apparatus as in claim 2, wherein said pressure pulse displays a relatively rapid rise and drop-off in pressure at about the time of fluid ejection.  
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          4.     An apparatus as in claim 1, wherein said volume is less than about 5 microliters.

          5.     An apparatus as in claim 1, wherein said volume is less than  
25    about 2 microliters.

          6.     An apparatus as in claim 1, wherein said hydrophobic medium is at least partially formed as a coating.

          7.     An apparatus as in claim 1, wherein said hydrophobic medium is  
30    at least partially formed of a polymeric material.

8. A method for non-contact dispensing of a fluid onto a substrate comprising the steps of:

a) providing an apparatus for non-contact dispensing of a fluid onto a substrate including:

5 a hydrophilic capillary dimensioned for drawing a liquid therein in a volume less than about 10 microliters;

a hydrophobic medium sealingly adjoining said capillary and defining an interface therewith for resisting flow of said liquid into said capillary beyond said interface; and

10 a source of a pressure for ejecting fluids drawn into said capillary;

b) drawing a liquid from a liquid source into said capillary substantially entirely by capillary action;

c) stopping the flow of said liquid substantially at said interface;

15 d) aligning said capillary with a predetermined location on said substrate; and

e) applying a pressure for ejecting fluids drawn into said capillary onto said substrate.

20 9. A method as in claim 8, wherein said source is adapted for delivering a pressure pulse and said step of applying a pressure includes applying a pressure pulse for ejecting fluids.

25 10. A method as in claim 8, wherein said volume is less than about 5 microliters.

11. A method as in claim 8, wherein said volume is less than about 2 microliters.

30 12. A method as in claim 8, wherein said hydrophobic medium is at least partially formed of a polymeric material.

13. A method as in claim 8, wherein said apparatus further includes another capillary and each of the capillaries includes a tip for assisting in dispensing fluids and the tips of each of the capillaries are aligned in a common plane.

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14. A method as in claim 13, wherein each of the capillaries is capable of delivering a different volume of fluid.

15. A method for non-contact parallel dispensing of fluids onto a substrate for forming a library of materials comprising the steps of:

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a) providing an apparatus for non-contact dispensing of a fluid onto a substrate including:

a plurality of parallel hydrophilic capillaries, each dimensioned for drawing a liquid therein in a volume less than about 10 microliters;

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a hydrophobic medium sealingly adjoining each of said capillaries and defining an interface therewith for resisting flow of said liquid into each said capillary beyond said interface; and

a source of a pressure pulse for ejecting fluids drawn into said capillaries;

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b) drawing a liquid from a liquid source into said capillaries substantially entirely by capillary action;

c) stopping the flow of said liquid substantially at said interface;

d) aligning said capillaries with a predetermined location on said substrate; and

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e) applying a pressure pulse for ejecting fluids drawn into said capillaries simultaneously onto regions of said substrate for defining a library of materials.

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16. A method as in claim 15, wherein said volume is less than about 5 microliters.

17. A method as in claim 15, wherein said volume is less than about 2 microliters.

18. A method as in claim 15, wherein said hydrophobic medium is at least partially formed of a polymeric material.

19. A method as in claim 15, wherein at least one of the plurality of capillaries is capable of delivering a different amount of fluid than at least one other of the plurality of capillaries.

20. A method as in claim 15, wherein each of the plurality of capillaries includes a tip for assisting in dispensing fluids and the tips of each of the plurality of capillaries are aligned in a common plane.

21. A method as in claim 15, wherein at least one of the plurality of capillaries includes a tip that is dimensionally different from at least one other of the plurality of capillaries for delivering a different amount of fluid than the at least one other of the plurality of capillaries.